

IBM Flex System EN2024 4-port 1Gb Ethernet Adapter

IBM Redbooks Product Guide

The IBM Flex System™ EN2024 4-port 1Gb Ethernet Adapter is a quad-port Gigabit Ethernet network adapter. When it is combined with the IBM Flex System EN2092 1Gb Ethernet Scalable Switch, clients can leverage an end-to-end 1 Gb solution on the IBM Flex System Enterprise Chassis. The EN2024 adapter is based on the Broadcom 5718 controller and offers a PCIe 2.0 x1 host interface with MSI/MSI-X. It also supports I/O virtualization features like VMware NetQueue and Microsoft VMQ technologies.

Figure 1 shows the adapter.



Figure 1. IBM Flex System EN2024 4-port 1Gb Ethernet Adapter

Did you know?

This EN2024 is based on the industry-standard PCIe architecture and is ideal for customers using Gigabit Ethernet in their network infrastructure. The IBM Flex System compute nodes support up to two of these adapters for a total of eight NICs per system.

Part number information

Table 1. Ordering part number and feature code

Description	Part number	Feature code (x-config)	Feature code (e-config)
IBM Flex System EN2024 4-port 1Gb Ethernet Adapter	49Y7900	A1BR	1763

The EN2024 4-port 1Gb Ethernet Adapter part number includes the following items:

- One adapter
- Documentation CD
- Important Notices flyer

Features

The IBM Flex System EN2024 4-port 1Gb Ethernet Adapter has these features:

- Dual Broadcom BCM5718 ASICs
- Quad-port Gigabit 1000BASE-X interface
- Two PCI Express 2.0 x1 host interfaces, one per ASIC
- Full-duplex (FDX) capability, enabling simultaneous transmission and reception of data on the Ethernet network
- MSI and MSI-X capabilities, up to 17 MSI-X vectors
- I/O virtualization support for VMware NetQueue, and Microsoft VMQ
- Seventeen receive queues and 16 transmit queues
- Seventeen MSI-X vectors supporting per-queue interrupt to host
- Function Level Reset (FLR)
- ECC error detection and correction on internal SRAM
- TCP, IP, and UDP checksum offload
- Large Send offload, TCP segmentation offload
- Receive-side scaling
- Virtual LANs (VLANs): IEEE 802.1q VLAN tagging
- Jumbo frames (9 KB)
- IEEE 802.3x flow control
- Statistic gathering (SNMP MIB II, Ethernet-like MIB [IEEE 802.3x, Clause 30])
- Comprehensive diagnostic and configuration software suite
- ACPI 1.1a-compliant: multiple power modes
- Wake-on-LAN (WOL) support
- Preboot Execution Environment (PXE) support
- RoHS-compliant

Supported servers

The following table lists the IBM Flex System compute nodes that support the adapters.

Table 2. Supported servers

Description	Part number	x220	x240	x440	p24L	p260	p460
IBM Flex System EN2024 4-port 1Gb Ethernet Adapter	49Y7900	Yes	Yes	Yes	Yes	Yes	Yes

See IBM® ServerProven at the following web address for the latest information about the expansion cards that are supported by each blade server type:

<http://ibm.com/servers/eserver/serverproven/compat/us/>

I/O adapter cards are installed in the slot in supported servers, such as the x240, as highlighted in the following figure.

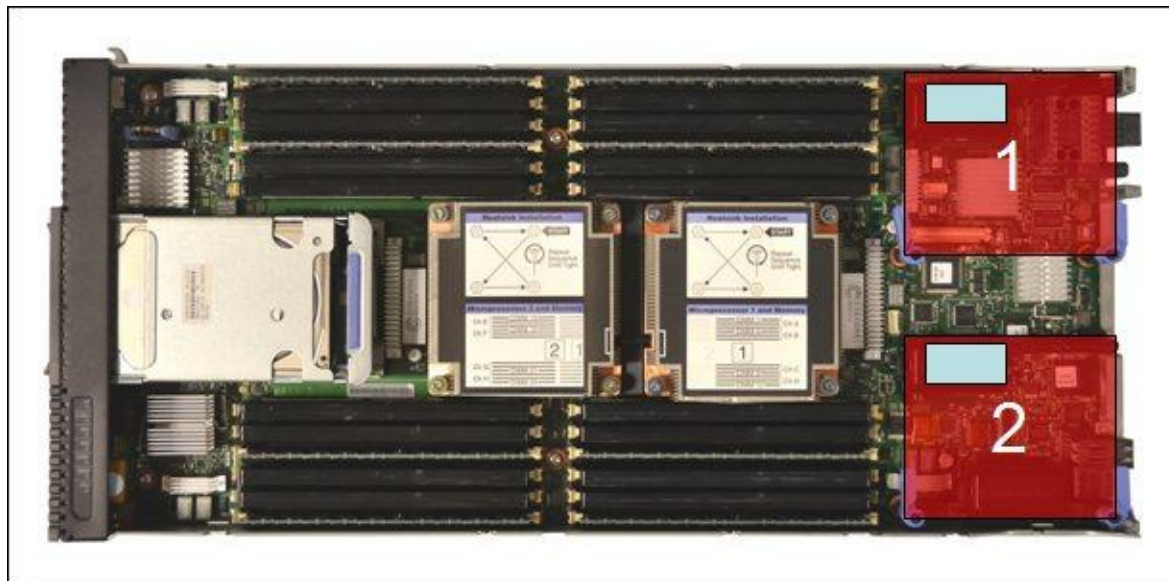


Figure 2. Location of the I/O adapter slots in the IBM Flex System x240 Compute Node

Supported I/O modules

These adapters can be installed in any I/O adapter slot of a supported IBM Flex System compute node. One or two compatible 1 Gb or 10 Gb I/O modules must be installed in the corresponding I/O bays in the chassis. The following table lists the switches that are supported. When connected to the 10Gb switch or pass-thru module, the internal switch ports will operate at 1Gb speeds.

Table 3. I/O modules and upgrades

Description	Part number	Feature code (x-config)	Feature code (e-config)
IBM Flex System EN2092 1Gb Ethernet Scalable Switch	49Y4294	A0TF	3598
IBM Flex System EN2092 1Gb Ethernet Scalable Switch (Upgrade 1)*	90Y3562	A1QW	3594
IBM Flex System Fabric EN4093 10Gb Scalable Switch	49Y4270	A0TB	3593
IBM Flex System Fabric EN4093 10Gb Scalable Switch (Upgrade 1)*	49Y4798	A1EL	3596
IBM Flex System EN4091 10Gb Ethernet Pass-thru**	88Y6043	A1QV	3700

* Upgrade 1 is required for the EN2092 and EN4093 to use all four ports on the adapter.

** The EN4091 Pass-thru has only 14 internal ports and so only supports ports 1 and 2 of the adapter.

Installing two switches means that all four ports of the adapter are enabled. However, the use of all four ports also requires Upgrade 1 of the supported 10 GbE and 1 GbE switches to be applied. Upgrade 1, as listed in the preceding table, enables 28 internal ports on each switch. The EN4091 Pass-thru has only 14 internal ports and so only supports ports 1 and 2 of the adapter. The following table shows the connections between adapters installed in the compute nodes to the switch bays in the chassis.

Table 4. Adapter to I/O bay correspondence

I/O adapter slot in the server	Port on the adapter	Corresponding I/O module bay in the chassis
Slot 1	Port 1	Module bay 1
	Port 2	Module bay 2
	Port 3*	Module bay 1
	Port 4*	Module bay 2
Slot 2	Port 1	Module bay 3
	Port 2	Module bay 4
	Port 3*	Module bay 3
	Port 4*	Module bay 4
Slot 3 (full-wide compute nodes only)	Port 1	Module bay 1
	Port 2	Module bay 2
	Port 3*	Module bay 1
	Port 4*	Module bay 2
Slot 4 (full-wide compute nodes only)	Port 1	Module bay 3
	Port 2	Module bay 4
	Port 3*	Module bay 3
	Port 4*	Module bay 4

* Ports 3 and 4 require Upgrade 1 of either the EN2092 1Gb or EN4093 10Gb switch. The EN4091 Pass-thru only supports ports 1 and 2 (and only when two I/O modules are installed).

The connections between the adapters installed in the compute nodes to the switch bays in the chassis are shown diagrammatically in the following figure. The figure shows both half-wide servers, such as the x240 with two adapters, and full-wide servers, such as the p460 with four adapters.

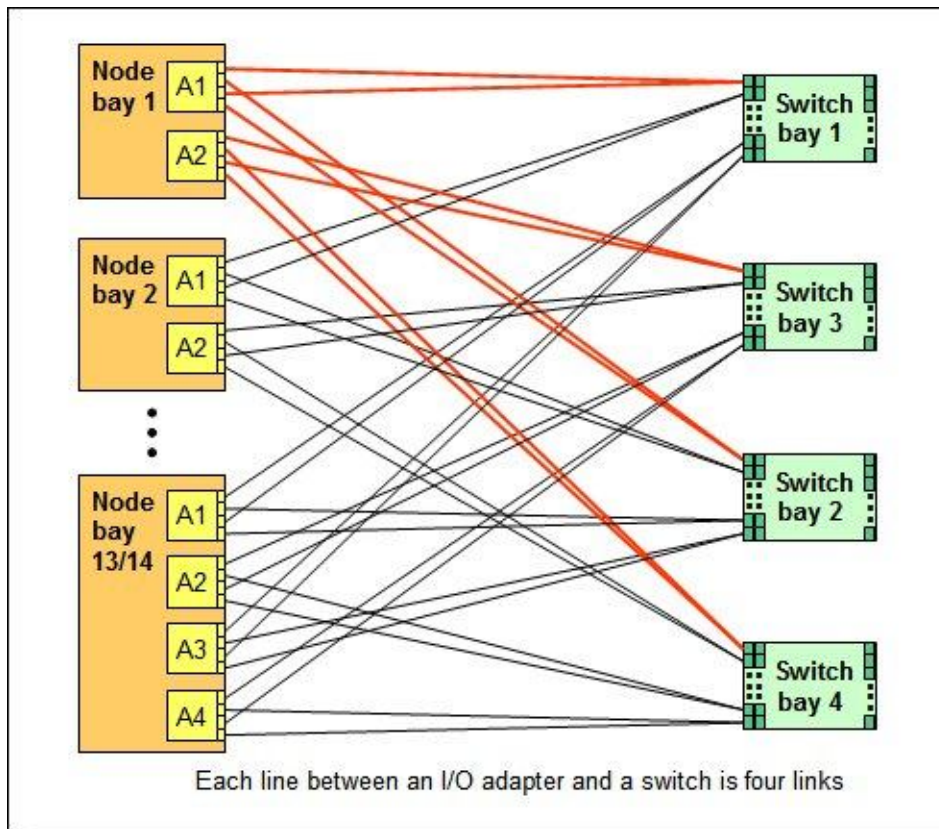


Figure 3. Logical layout of the interconnects between I/O adapters and I/O modules

Operating system support

The IBM Flex System EN2024 4-port 1Gb Ethernet Adapter supports the following operating systems.

Intel processor-based servers:

- Microsoft Windows Server 2008 HPC Edition
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1
- VMware ESXi 4.1
- VMware vSphere 5
- VMware vSphere 5.1

POWER7 processor-based servers:

- IBM AIX Version 6.1
- IBM AIX Version 7.1
- IBM i 6.1
- IBM i 7.1
- IBM Virtual I/O Server
- Red Hat Enterprise Linux 5 for IBM POWER
- SUSE LINUX Enterprise Server 11 for IBM POWER

Support for operating systems is based on the combination of the expansion card and the blade server on which it is installed. See the IBM ServerProven website for the latest information about the specific versions and service packs supported. Select the blade server, and then select the expansion card to see the supported operating systems: <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>

Warranty

There is a 1-year, customer-replaceable unit (CRU) limited warranty. When installed in a server, these adapters assume your system's base warranty and any IBM ServicePac® upgrade.

Physical specifications

The dimensions and weight of the adapter are as follows:

- Width: 100 mm (3.9 inches)
- Depth: 80 mm (3.1 inches)
- Weight: 13 g (0.3 lb)

Shipping dimensions and weight (approximate):

- Height: 58 mm (2.3 in)
- Width: 229 mm (9.0 in)
- Depth: 208 mm (8.2 in)
- Weight: 0.4 kg (0.89 lb)

Regulatory compliance

The adapter conforms to the following standards:

- United States FCC 47 CFR Part 15, Subpart B, ANSI C63.4 (2003), Class A
- United States UL 60950-1, Second Edition
- IEC/EN 60950-1, Second Edition
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1-03
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- IEC 60950-1(CB Certificate and CB Test Report)
- Taiwan BSMI CNS13438, Class A
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A

Popular configurations

The adapters can be used in various configurations. The following figure shows EN2024 4-port 1Gb Ethernet Adapters installed in both slots of the x240 (a model without the Embedded 10Gb Virtual Fabric Adapter), which in turn is installed in the chassis. The chassis also has four IBM Flex System EN2092 1Gb Ethernet Scalable Switches, each with Upgrade 1 installed to enable 28 internal ports.

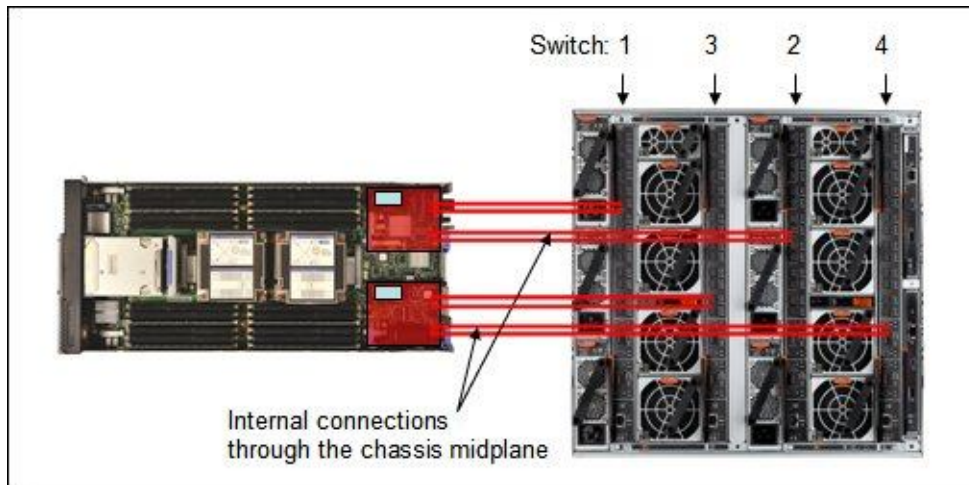


Figure 4. Example configuration

The following table lists the parts that are used in the configuration.

Table 5. Components used when connecting the adapter to the 10 GbE switches

Part number	Description	Quantity
8737-x1x	IBM Flex System x240 Compute Node (without Embedded 10Gb Virtual Fabric Adapter) or other supported server	1 to 14
90Y3554	IBM Flex System EN2024 4-port 1Gb Ethernet Adapter	2 per server
8721-A1x	IBM Flex System Enterprise Chassis	1
49Y4294	IBM Flex System EN2092 1Gb Ethernet Scalable Switch	4
90Y3562	IBM Flex System EN2092 1Gb Ethernet Scalable Switch (Upgrade 1)	4

Related publications

For more information refer to the following resources:

- IBM Flex System EN2092 1Gb Ethernet Scalable Switch Product Guide
<http://www.redbooks.ibm.com/abstracts/tips0861.html>
- IBM Flex System Fabric EN4093 10Gb Scalable Switch Product Guide
<http://www.redbooks.ibm.com/abstracts/tips0864.html>
- IBM Flex System EN4091 10Gb Ethernet Pass-thru Product Guide
<http://www.redbooks.ibm.com/abstracts/tips0865.html>
- IBM Flex System x240 Compute Node Product Guide
<http://www.redbooks.ibm.com/abstracts/tips0860.html>
- IBM Flex System p260 and p460 Compute Node Product Guide
<http://www.redbooks.ibm.com/abstracts/tips0880.html>
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<http://ibm.com/support>
- IBM Redbooks Product Guides for IBM Flex System servers and options
<http://www.redbooks.ibm.com/portals/puresystems>
- Configuration and Option Guide
<http://www.ibm.com/systems/xbc/cog/>

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